REMARKS

By the above actions, claim 1 has been amended to specify that the cross flow fan has a minimum diameter of 130 mm. In view of this action and the following remarks, further consideration of this application is requested.

With regard to the Examiner's rejection of claims 1-4, under 35 U.S.C. § 103(a), as being obvious in view of the teachings of the newly cited Oliver et al. ('103) and Myers et al. ('450) patents, the Applicant respectfully traverses this rejection.

As noted in the earlier Amendment of June 27, 2003, the currently claimed invention is drawn to the recognition by the inventor that a stable operation at a repetition rate of 4kHz is only possible when both the number of rotations of the fan blade, i.e., peripheral speed, and the fan diameter are selected to avoid the downstream arcing in the laser chamber. Such a discovery is clearly discussed in the specification, beginning at page 4, lines 5-16, and continuing at page 5, line 16, to page 6, line 16, as well as being illustrated in Figure 2. Furthermore, the table of Fig. 2 shows that, for fan diameters of 130, 140, 150 mm, a suitable minimum peripheral speed is obtained both when no downstream arcing is generated and under stable electrical discharge.

With regard to the Examiner's rejection of claims 1-4 in view of the teachings of Oliver et al. ('103) and Myers et al. ('450), the Applicant initially points out that the Examiner's reliance on the Myer et al. patent for the teaching that the gas discharge laser taught therein has a "rotational speed...3500 rpm with the fan unit of 5", is improper since those teachings are not prior art relative to the presently claimed invention. That is, the instant application was filed on February 8, 2001 and the first parent (C-I-P) application for the Myers et al. patent that is prior to applicants' filing date is Application S.N. 09/768,753 (published Patent Application 20010050939, copy attached) which was filed on January 23, 2001. However, a detailed review of the '753 application reveals that neither the "3500 rpm" feature of the Myers et al.

patent or the "fan unit of 5"" of the Myers et al. patent are explicitly taught or remotely suggested by the '753 application. Therefore, since there is no support for the relied upon feature in the parent C-I-P of the Myers et al. patent, it does not have an effective date for the features relied upon by the Examiner that is prior to the February 8, 2001 filing date of the instant application and is not prior art (for those teachings) relative claims 1-4. Consequently, the rejection of claims 1-4, under § 103, must be withdrawn.

Further, with regard to the asserted combination of teachings of Myers et al. and Oliver et al., Oliver et al. teach a gas discharge laser comprising a laser cavity, a pair of main discharge electrodes, a cross-flow fan within the laser chamber and a bearing structure for supporting the cross-flow fan (see, Figs. 1, 3, and 4 in connection with claim 1).

Additionally, the patentees (column 3, lines 57-59) state that the blade structure of the cross-flow fan has a diameter of 5 inches (127 mm). This is below the range now claimed and there is nothing in the disclosure of these patents which would provide a reason or motivation for using a cross-flow fan has a larger diameter than that which they have disclosed. On the other hand, since a larger fan would increase the size and presumably the cost of the unit, one of ordinary skill would not increase the size of the disclosed prior art fan without some reason for doing so.

Myers et al. disclose a high repetition rate gas discharge laser system operating at a repetition rate of 4000 Hz or greater (abstract and claim 1). The preferred embodiment described (columns 29-30) operates at a repetition rate of 4000 Hz. Thus, in the preferred embodiment, there is an overlap with the claimed invention as to the 4000 Hz limitation. The patentees (column 29, lines 14-17) teach the diameter of the cross-flow fan is 5 inches (127 mm) and the rotational speed about 3500 rpm. Notwithstanding that these teachings of Myers et al are not prior art to the instant claims, the fan diameters of Oliver et al. and Myers et al. (i.e., 127 mm) lie between the values of 120 mm and 130 mm specified in Fig. 2 of the present application. For

these fan diameters, the minimum number of rotations of the fan where no downstream arcing is generated are 4000 rpm (@120mm) and 3700 rpm (@130mm), respectively. Accordingly, the minimum number of rotations for a 127 mm diameter fan must in any case be higher than 3700 rpm if the downstream arcing is to be avoided. The 3500 rpm of Myers et al. is clearly below the 3700 rpm value necessary to avoid the downstream arching taught by the present application. As a consequence, the fan of Myers et al. does not operate at a peripheral speed of 25.0 m/s or more. The peripheral speed actually is 23.3 m/s (calculated according to the formula: (0.127/2) x (3500/60) x 2π). Thus, downstream arcing cannot be avoided by Myers et al.

In fact, Myers et al. (column 3, line 8-15) disclose a completely different solution in order to provide a high repetition gas laser device with stable laser output. The proposed solution is realized by employing two separate discharge chambers, one of which is part of a master oscillator producing a very narrow band seed beam which is amplified in the second discharge chamber. Consequently, a person of ordinary skill faced with the Myers et al. reference would not investigate and discover the relation between fan diameter and fan speed as presently disclosed and claimed. The same is true for Oliver et al., as both references are silent about the relation fan diameter and fan speed relative to downstream arching and the beneficial effects (stable operation) of proper control of those parameters.

In addition, Oliver et al. teach, for a laser operating at a pulse rate of 5000 pulse/sec operation, a 127 mm fan which is rotated at 5000 rpm (column 3, line 65; not 5000 rpm "or less" as asserted by the Examiner) which could have a peripheral speed of more than 25.0 m/s, but the patentees teach no relation to the peripheral speed of the fan and the fan diameter to the downstream arching problem occurring at 4 kHz repetition rate in order to direct one of ordinary skill in the prior art to modify the teachings of Myers et al. to arrive at the invention set forth in the above claims.

Additionally, relative to claim 3, it is point out that the 5000 rpm speed of Oliver et al.'s fan is above what the present applicants have disclosed to be the

suitable maximum speed (see, e.g., page 7, lines 21-22) for a roller bearing fan. In this respect, Oliver discloses that it is a roller bearing fan in the paragraph spanning columns 2 & 3 and at column 3, first paragraph) and the 3000 rpm speed on line 65 of column 3 refers to "a prior art 3.25" fan not their 5 inch fan. There is simply no basis for concluding that Oliver et al. teach use of a 4500 rpm speed being suitable for their 5 inch cross flow fan or of any problem associated with the use of the 5000 rpm speed taught by them for use with their roller bearing fan.

As already mentioned above, a stable operation at a repetition rate of 4 kHz or more is possible, when both the number of rotations and the fan diameter are optimized in order to avoid downstream arching in the laser chamber. Instead of this relation, Oliver et al. (column 1, lines 57-60) teach to increase the pulse repetition of a gas discharge laser by increasing the fan speed, irrespective of the fan diameter, which alone can not provide the desired stable laser operation at 4 kHz or more, as discussed in the present application.

Finally, with regard to claim 4, the deficiencies of the cited Oliver et al. and Myers et al. patents are recognized by the Examiner in the Office Action. The Examiner attempts to remedy the deficiencies of Oliver et al. and Myers et al. by stating that a person of ordinary skill in the art could have found those values by simple experimentation to find the optimum values for operation, citing *In re Aller*, 105 USPQ 233.

In rebuttal, the Applicant again asserts that Examiner has mistakenly applied the above case law and further that the reliance on *In re Aller* to establish obviousness is erroneous. As pointed out in the Amendment of June 27, 2003, MPEP Chapter 2144.08(II)(A) and (B) discusses the current state of the case law relating to optimization of variables as:

> A particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieved a recognized result, before a determination of the optimum or workable range of said variable

might be characterized as routine experimentation. *In re Antonie*, 559 F2d 618, 195 USPQ 6 (CCPA 1977) (emphasis added)

Applying this principle to the instant claim 4, the Applicants note that there is no appreciation in the prior art of any relationship between fan diameter and peripheral speed which results in an improvement (decrease) in the downstream arcing problem mentioned in the prior art. Further, at page 2, fifth paragraph, it is also stated, that a mere increase of the number of rotations of the fan as proposed in the prior art could not provide the desired stable laser operation at 4 kHz or more. Additionally, as disclosed at page 6, third paragraph, of the specification, the inventors has discovered that vibrations are generated which lead to a deterioration of the degree of wavelength stability when the number of rotations is unnecessarily high. This discovery is clearly illustrated in Figures 3 and 4 in connection with the discussion of the invention at pages 7-8 of the specification.

Simply put, the problem of providing a stable laser operation (reduced arcing) at a repetition rate of 4 kHz or more cannot be solved by just increasing the rotational speed of the fan. It is the present inventors who have recognized that a stable operation at a repetition rate of 4kHz is only possible when both the number of rotations of the fan blade, i.e., peripheral speed, and the fan diameter are selected to avoid the downstream arching in the laser chamber, and specifically, that stable operation can be achieved at less than 5000 rpm. These related, result-effective variables of peripheral speed, fan diameter and rpm's are not appreciated by either Oliver et al. or Myers et al.

In light of the teachings of the Applicants' prior art regarding fan speed alone not preventing downstream arcing, the Applicants also assert that it is unlikely that the laser device of Myers et al. or Oliver et al. will actually lead to stable operation at repetition rates of 4 kHz or more. Without the recognition of the present invention by Myers et al. or Oliver et al., the Applicants assert that the Examiner has incorrectly applied the principles necessary to establish a *prima facie* case of obviousness by the

citation of the Myers et al. and Oliver et al. references. Consequently, for these additional reasons, the rejection of claims 1-4, under § 103(a), is improper and must now be withdrawn.

While the present application is now believed to be in condition for allowance, should the Examiner find some issue to remain unresolved, or should any new issues arise, which could be eliminated through discussions with Applicant's representative, then the Examiner is invited to contact the undersigned by telephone in order that the further prosecution of this application can thereby be expedited.

Respectfully submitted,

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